Curriculum Vitae

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Brief Bio

I hold a PhD in Nuclear Physics from Aarhus University, Denmark. For more than ten years, I was a frequent visitor at large international accelerator laboratories such as CERN in Switzerland where I led a number successful experimental collaborations, which have advanced our understanding of the nuclear processes that generate energy and transmute chemical elements in the interiors of stars. Eager to put my knowledge and analytical skills to use in a more applied setting, I joined the MERIDIAN project in 2018. Based at the Institute for Big Data Analytics at Dalhousie University, Canada, I am now leading a team of data scientists and software developers in creating novel data analytics and modeling tools for use in underwater acoustics.

Employment History

2020–Present: Senior Staff Scientist at Institute for Big Data Analytics, Dalhousie University

2019–Present: Adjunct Professor at Faculty of Computer Science, Dalhousie University

2018–2020: Lead Acoustic Data Analyst at Institute for Big Data Analytics, Dalhousie University

2015–2018: Assistant Professor at Department of Physics and Astronomy, Aarhus University

2013–2015: Postdoc at Department of Physics and Astronomy, Aarhus University

2010–2013: Postdoc at TRIUMF

University Education

2006–2010: PhD Physics, Aarhus University

2005–2006: Fulbright student, University of Washington

2002–2005: BSc Physics and Mathemathics, Aarhus University

Grants and Awards[1]

2020: Ocean Frontier Institute Visiting Fellowship, 5k

2019: NVIDIA Accelerated Data Science GPU Grant, 3k

2015-2018: "Nuclear astrophysics at the precision frontier", The Villum Foundation Young Investigator Programme, 580k

2010-2012: "Experiments in nuclear astrophysics with radioactive beams at the ISAC-II facility at TRIUMF", The Villum Foundation Postdoc Fellowship, 190k

2007: Foreign Graduate Student Invitation Program Grant, Tokyo Institute of Technology, Japan

2005: The Danish-American Fulbright Commission, 17k

2005: Nordea Danmark-fonden, 4.0k

2005: Faculty of Science, Aarhus University, 1.9k

2005: Etatsråd CG Filtenborg og Hustru Marie Filtenborgs Studielegat, 1.0k

2005: Observator mag.scient Julie Marie Vinter Hansens Rejselegat, 1.0k

2002: International Physics Olympiad Honorable Mention

[1] Grant amount in CAD

Publications

Over 40 peer-reviewed research articles (14 first authorships), 23 conference proceedings, and 3 feature articles; 585 citations and h-index of 13.[2] A few key publications are listed below. For a complete list, see page 4.

O. S. Kirsebom, *et al.*, 2020. *Performance of a deep neural network at detecting North Atlantic right whale upcalls*, The Journal of the Acoustical Society of America **147**, 2636–2646. Citations: 0

O. S. Kirsebom, *et al.*, 2019. *Discovery of an Exceptionally Strong β-Decay Transition of ^{20}F and Implications for the Fate of Intermediate-Mass Stars*, Physical Review Letters **123**, 262701. Citations: 0

O. S. Kirsebom, *et al.*, 2018. *First Accurate Normalization of the β-delayed α Decay of ^{16}N and Implications for the $^{12}C(\alpha,\gamma)^{16}O$ Astrophysical Reaction Rate*, Physical Review Letters **121**, 142701. Citations: 1

O. S. Kirsebom, *et al.*, 2012. *Improved Limit on Direct α Decay of the Hoyle State*, Physical Review Letters **108**, 202501. Citations: 50

O. S. Kirsebom and B. Davids, 2011. *One fewer solution to the cosmological lithium problem*, Physical Review C **84**, 058801. Citations: 35

O. S. Kirsebom, *et al.*, 2011. *Precise and accurate determination of ^{8}B decay spectrum*, Physical Review C **83**, 065802. Citations: 18

O. S. Kirsebom, *et al.*, 2010. *Breakup of ^{12}C resonances into three α particles*, Physical Review C **81**, 064313. Citations: 51

O. S. Kirsebom, *et al.*, 2009. *Observation of γ-delayed 3α breakup of the 15.11 and 12.71 MeV states in ^{12}C*, Physics Letters B **680**, 44–49. Citations: 21

Software

2020: *kadlu*, docs.meridian.cs.dal.ca/kadlu/, M. Smith and O. S. Kirsebom

2019: *ketos*, docs.meridian.cs.dal.ca/ketos/, F. Frazao and O. S. Kirsebom

2018: *simX*, 10.5281/zenodo.1320121, M. Munch and J. H. Jensen and O. S. Kirsebom

2018: *Open R-matrix (ORM)*, 10.5281/zenodo.1174079, M. Munch and O. S. Kirsebom and J. Refsgaard

Talks

Numerous (> 50) presentations at international conferences and workshops including several invited talks. For a complete list, see oliskir.github.io.

Spokespersonships (P.I.)

2015–2018: *Search for the 2nd-forbidden ground-state transition in the β decay of ^{20}F*, JYFL

2015–2018: *Absolute measurement of the $\beta\alpha$ decay of ^{16}N*, ISOLDE

2012–2015: *β-delayed α-decay study of ^{16}N using the implantation method*, KVI

2011–2015: *Lifetime Measurement of the 7.786 MeV State in ^{23}Mg*, TRIUMF

Teaching

2013–2017: Extracurricular programme for 1st-year students, Coordinator

2015: Nuclear astrophysics graduate course, Lecturer

2014: Electromagnetism laboratory course, Coordinator

2006–2010: Physics and mathematics undergraduate courses, Teaching Assistant

[2] Source: Web of Science, 2021.05.07.

Student Supervision

2019–2020: Xuhui Liu, MSc Computer Science, Dalhousie University (co-supervisor)

2016–2017: Helle Bisgaard Sørensen, MSc Physics, Aarhus University

2014–2015: Sofie Tilbæk Nielsen, BSc Physics, Aarhus University

Conference and Workshop Organization

21-22 Nov 2019: Organizer of the workshop "Detection and Classification in Marine Bioacoustics with Deep Learning" with approx. 30 participants from Canada, the U.S. and Europe.

Academic Services

2016–2018: Member of the Liaison Committee at the Department of Physics and Astronomy, Aarhus University

Refereeing

Physics Review Letters, Physical Review C, The Astrophysical Journal, Journal of the Acoustical Society of America, Hyperfine Interactions, Methods in Ecology and Evolution.

Professional Memberships

2018–Present: Member of the Canadian Acoustical Association

2013–2018: Member of the Danish Physical Society

Publications

Research Articles

N. J. Hubbard, C. A. Diget, S. P. Fox, H. O. U. Fynbo, A. M. Howard, O. S. Kirsebom, A. M. Laird, M. Munch, A. Parikh, M. Pignatari, and J. R. Tomlinson. *New Experimental 23Na(, p)26Mg Reaction Rate for Massive Star and Type Ia Supernova Models.* The Astrophysical Journal **912**, 59 (2021), URL http://dx.doi.org/10.3847/1538-4357/abee91

B. Padovese, F. Frazao, O. S. Kirsebom, and S. Matwin. *Data augmentation for the classification of North Atlantic right whales upcalls.* The Journal of the Acoustical Society of America **149**, 2520–2530 (2021), URL http://dx.doi.org/10.1121/10.0004258

O. S. Kirsebom, A. M. Howard, M. Munch, S. Sablok, J. A. Swartz, and H. O. U. Fynbo. *Experimental study of the $^{11}B(p,3\alpha)\gamma$ reaction at E_p = 0.5–2.7 MeV.* The European Physical Journal A **56**, 179 (2020), URL http://dx.doi.org/10.1140/epja/s10050-020-00183-z

O. S. Kirsebom, F. Frazao, Y. Simard, N. Roy, S. Matwin, and S. Giard. *Performance of a deep neural network at detecting North Atlantic right whale upcalls.* The Journal of the Acoustical Society of America **147**, 2636–2646 (2020), URL http://dx.doi.org/10.1121/10.0001132

M. Munch, O. S. Kirsebom, J. A. Swartz, and H. O. U. Fynbo. *Resolving the $^{11}B(p,\alpha_0)$ cross-section discrepancies between 0.5 and 3.5 MeV.* The European Physical Journal A **56**, 17 (2020), URL http://dx.doi.org/10.1140/epja/s10050-019-00016-8

O. S. Kirsebom, S. Jones, D. F. Strömberg, G. Martínez-Pinedo, K. Langanke, F. K. Röpke, B. A. Brown, T. Eronen, H. O. U. Fynbo, M. Hukkanen, A. Idini, A. Jokinen, A. Kankainen, J. Kostensalo, I. Moore, H. Möller, S. T. Ohlmann, H. Penttilä, K. Riisager, S. Rinta-Antila, P. C. Srivastava, J. Suhonen, W. H. Trzaska, and J. Äystö. *Discovery of an Exceptionally Strong β-Decay Transition of ^{20}F and Implications for the Fate of Intermediate-Mass Stars.* Phys. Rev. Lett. **123**, 262701 (2019), URL http://dx.doi.org/10.1103/PhysRevLett.123.262701

O. S. Kirsebom, M. Hukkanen, A. Kankainen, W. H. Trzaska, D. F. Strömberg, G. Martínez-Pinedo, K. Andersen, E. Bodewits, B. A. Brown, L. Canete, J. Cederkäll, T. Enqvist, T. Eronen, H. O. U. Fynbo, S. Geldhof, R. de Groote, D. G. Jenkins, A. Jokinen, P. Joshi, A. Khanam, J. Kostensalo, P. Kuusiniemi, K. Langanke, I. Moore, M. Munch, D. A. Nesterenko, J. D. Ovejas, H. Penttilä, I. Pohjalainen, M. Reponen, S. Rinta-Antila, K. Riisager, A. de Roubin, P. Schotanus, P. C. Srivastava, J. Suhonen, J. A. Swartz, O. Tengblad, M. Vilen, S. Vínals, and J. Äystö. *Measurement of the $2^+ \to 0^+$ ground-state transition in the β decay of ^{20}F.* Phys. Rev. C **100**, 065805 (2019), URL http://dx.doi.org/10.1103/PhysRevC.100.065805

B. Davids, M. Williams, N. E. Esker, M. Alcorta, D. Connolly, B. R. Fulton, K. Hudson, N. Khan, O. S. Kirsebom, J. Lighthall, and P. Machule. *Initial operation of the recoil mass spectrometer EMMA at the ISAC-II facility of TRIUMF.* Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment **930**, 191–195 (2019), URL http://dx.doi.org/https://doi.org/10.1016/j.nima.2019.03.070

O. S. Kirsebom, O. Tengblad, R. Lica, M. Munch, K. Riisager, H. O. U. Fynbo, M. J. G. Borge, M. Madurga, I. Marroquin, A. N. Andreyev, T. A. Berry, E. R. Christensen, P. D. Fernández, D. T. Doherty, P. Van Duppen, L. M. Fraile, M. C. Gallardo, P. T. Greenlees, L. J. Harkness-Brennan, N. Hubbard, M. Huyse, J. H. Jensen, H. Johansson, B. Jonson, D. S. Judson, J. Konki, I. Lazarus, M. V. Lund, N. Marginean, R. Marginean, A. Perea, C. Mihai, A. Negret, R. D. Page, V. Pucknell, P. Rahkila, O. Sorlin, C. Sotty, J. A. Swartz, H. B. Sørensen, H. Törnqvist, V. Vedia, N. Warr, and H. De Witte. *First Accurate Normalization of the β-delayed α Decay of ^{16}N and Implications for the $^{12}C(\alpha,\gamma)^{16}O$ Astrophysical Reaction Rate.* Physical Review Letters **121**, 142701 (2018), URL http://dx.doi.org/10.1103/PhysRevLett.121.142701

M. Dahl, A. Brun, O. S. Kirsebom, and G. Andresen. *Improving Short-Term Heat Load Forecasts with Calendar and Holiday Data*. Energies **11**, 1678 (2018), URL http://dx.doi.org/10.3390/en11071678

M. Munch, O. S. Kirsebom, J. A. Swartz, K. Riisager, and H. O. U. Fynbo. *Measurement of the full excitation spectrum of the $^{7}Li(p,\gamma)\alpha\alpha$ reaction at 441 keV*. Physics Letters B **782**, 779–784 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.06.013

J. Refsgaard, H. O. U. Fynbo, O. S. Kirsebom, and K. Riisager. *Three-body effects in the Hoyle-state decay*. Physics Letters B **779**, 414–419 (2018), URL http://dx.doi.org/10.1016/j.physletb.2018.02.031

V. Pesudo, M. J. G. Borge, A. M. Moro, J. A. Lay, E. Nácher, J. Gómez-Camacho, O. Tengblad, L. Acosta, M. Alcorta, M. A. G. Alvarez, C. Andreoiu, P. C. Bender, R. Braid, M. Cubero, A. D. Pietro, J. P. Fernández-García, P. Figuera, M. Fisichella, B. R. Fulton, A. B. Garnsworthy, G. Hackman, U. Hager, O. S. Kirsebom, K. Kuhn, M. Lattuada, G. Marquínez-Durán, I. Martel, D. Miller, M. Moukaddam, P. D. O'Malley, A. Perea, M. M. Rajabali, A. M. Sánchez-Benítez, F. Sarazin, V. Scuderi, C. E. Svensson, C. Unsworth, and Z. M. Wang. *Scattering of the Halo Nucleus ^{11}Be on ^{197}Au at Energies around the Coulomb Barrier*. Physical Review Letters **118**, 152502 (2017), URL http://dx.doi.org/10.1103/physrevlett.118.152502

M. V. Lund, A. Andreyev, M. J. G. Borge, J. Cederkll, H. D. Witte, L. M. Fraile, H. O. U. Fynbo, P. T. Greenlees, L. J. Harkness-Brennan, A. M. Howard, M. Huyse, B. Jonson, D. S. Judson, O. S. Kirsebom, J. Konki, J. Kurcewicz, I. Lazarus, R. Lica, S. Lindberg, M. Madurga, N. Marginean, R. Marginean, I. Marroquin, C. Mihai, M. Munch, E. Nacher, A. Negret, T. Nilsson, R. D. Page, S. Pascu, A. Perea, V. Pucknell, P. Rahkila, E. Rapisarda, K. Riisager, F. Rotaru, C. Sotty, M. Stanoiu, O. Tengblad, A. Turturica, P. V. Duppen, V. Vedia, R. Wadsworth, and N. Warr. *Beta-delayed proton emission from ^{20}Mg*. The European Physical Journal A **52**, 304 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16304-x

K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. *Complete kinematical study of the 3α breakup of the 16.11 MeV state in ^{12}C*. The European Physical Journal A **52**, 271 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16271-2

M. Munch, M. Alcorta, H. O. U. Fynbo, M. Albers, S. Almaraz-Calderon, M. L. Avila, A. D. Ayangeakaa, B. B. Back, P. F. Bertone, P. F. F. Carnelli, M. P. Carpenter, C. J. Chiara, J. A. Clark, B. DiGiovine, J. P. Greene, J. L. Harker, C. R. Hoffman, N. J. Hubbard, C. L. Jiang, O. S. Kirsebom, T. Lauritsen, K. L. Laursen, S. T. Marley, C. Nair, O. Nusair, D. Santiago-Gonzalez, J. Sethi, D. Seweryniak, R. Talwar, C. Ugalde, and S. Zhu. *Independent measurement of the Hoyle state β feeding from ^{12}B using Gammasphere*. Physical Review C **93**, 065803 (2016), URL http://dx.doi.org/10.1103/physrevc.93.065803

O. S. Kirsebom, P. Bender, A. Cheeseman, G. Christian, R. Churchman, D. S. Cross, B. Davids, L. J. Evitts, J. Fallis, N. Galinski, A. B. Garnsworthy, G. Hackman, J. Lighthall, S. Ketelhut, P. Machule, D. Miller, S. T. Nielsen, C. R. Nobs, C. J. Pearson, M. M. Rajabali, A. J. Radich, A. Rojas, C. Ruiz, A. Sanetullaev, C. D. Unsworth, and C. Wrede. *Measurement of lifetimes in ^{23}Mg*. Physical Review C **93**, 025802 (2016), URL http://dx.doi.org/10.1103/physrevc.93.025802

J. Refsgaard, O. Kirsebom, E. Dijck, H. Fynbo, M. Lund, M. Portela, R. Raabe, G. Randisi, F. Renzi, S. Sambi, A. Sytema, L. Willmann, and H. Wilschut. *Measurement of the branching ratio for β-delayed α decay of ^{16}N*. Physics Letters B **752**, 296–301 (2016), URL http://dx.doi.org/10.1016/j.physletb.2015.11.047

K. L. Laursen, H. O. U. Fynbo, O. S. Kirsebom, K. S. Madsbøll, and K. Riisager. *Unbound states in ^{12}C populated by γ-decay of the $(J^{\pi},T) = (2^{+},1)$ 16.11 MeV state*. The European Physical Journal A **52**, 370 (2016), URL http://dx.doi.org/10.1140/epja/i2016-16370-0

V. Margerin, G. Lotay, P. J. Woods, M. Aliotta, G. Christian, B. Davids, T. Davinson, D. T. Doherty, J. Fallis, D. Howell, O. S. Kirsebom, D. J. Mountford, A. Rojas, C. Ruiz, and J. A. Tostevin. *Inverse Kinematic Study of the $^{26g}Al(d,p)Al^{27}$ Reaction and Implications for Destruction of ^{26}Al in Wolf-Rayet and Asymptotic Giant Branch Stars*. Physical Review Letters **115**, 062701 (2015), URL http://dx.doi.org/10.1103/physrevlett.115.062701

A. M. Howard, M. Munch, H. O. U. Fynbo, O. S. Kirsebom, K. L. Laursen, C. A. Diget, and N. J. Hubbard. *$^{23}Na(\alpha,p)^{26}Mg$ Reaction Rate at Astrophysically Relevant Energies.* Physical Review Letters **115**, 052701 (2015), URL http://dx.doi.org/10.1103/physrevlett.115.052701

O. S. Kirsebom, H. O. U. Fynbo, K. Riisager, R. Raabe, and T. Roger. *Analysis of the response of silicon detectors to α particles and ^{16}O ions.* Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment **758**, 57–61 (2014), URL http://dx.doi.org/10.1016/j.nima.2014.05.005

K. L. Laursen, O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. *High-statistics measurement of the β-delayed α spectrum of ^{20}Na.* The European Physical Journal A **49**, 79 (2013), URL http://dx.doi.org/10.1140/epja/i2013-13079-6

M. J. G. Borge, L. M. Fraile, H. O. U. Fynbo, B. Jonson, O. S. Kirsebom, T. Nilsson, G. Nyman, G. Possnert, K. Riisager, and O. Tengblad. *Rare βp decays in light nuclei.* Journal of Physics G: Nuclear and Particle Physics **40**, 035109 (2013), URL http://dx.doi.org/10.1088/0954-3899/40/3/035109

O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, H. O. U. Fynbo, M. Madurga, and O. Tengblad. *Observation of α decay from a state in ^{10}B at 11.48 MeV.* Physical Review C **85**, 054308 (2012), URL http://dx.doi.org/10.1103/physrevc.85.054308

O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, B. Jonson, M. Madurga, T. Nilsson, G. Nyman, K. Riisager, O. Tengblad, and M. Turrión. *Improved Limit on Direct α Decay of the Hoyle State.* Physical Review Letters **108**, 202501 (2012), URL http://dx.doi.org/10.1103/physrevlett.108.202501

T. Roger, J. Büscher, B. Bastin, O. S. Kirsebom, R. Raabe, M. Alcorta, J. Äystö, M. J. G. Borge, M. Carmona-Gallardo, T. E. Cocolios, J. Cruz, P. Dendooven, L. M. Fraile, H. O. U. Fynbo, D. Galaviz, L. R. Gasques, G. S. Giri, M. Huyse, S. Hyldegaard, K. Jungmann, W. L. Kruithof, M. Lantz, A. Perea, K. Riisager, A. Saastamoinen, B. Santra, P. D. Shidling, M. Sohani, A. J. Sørensen, O. Tengblad, E. Traykov, D. J. van der Hoek, P. V. Duppen, O. O. Versolato, and H. W. Wilschut. *Precise Determination of the Unperturbed ^{8}B Neutrino Spectrum.* Physical Review Letters **108**, 162502 (2012), URL http://dx.doi.org/10.1103/physrevlett.108.162502

M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Domínguez-Reyes, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, D. Galaviz, S. Hyldegaard, H. Jeppesen, B. Jonson, O. S. Kirsebom, M. Madurga, A. Maira, A. Muñoz-Martín, T. Nilsson, G. Nyman, D. Obradors, A. Perea, K. Riisager, O. Tengblad, and M. Turrion. *Properties of12C resonances determined from the $^{10}B(^{3}He,p\alpha\alpha\alpha)$ and $^{11}B(^{3}He,d\alpha\alpha\alpha)$ reactions studied in complete kinematics.* Physical Review C **86**, 064306 (2012), URL http://dx.doi.org/10.1103/physrevc.86.064306

O. S. Kirsebom and B. Davids. *One fewer solution to the cosmological lithium problem.* Physical Review C **84**, 058801 (2011), URL http://dx.doi.org/10.1103/physrevc.84.058801

O. S. Kirsebom, H. O. U. Fynbo, A. Jokinen, M. Madurga, K. Riisager, A. Saastamoinen, O. Tengblad, and J. Äystö. *New β-delayed proton lines from ^{23}Al.* The European Physical Journal A **47**, 130 (2011), URL http://dx.doi.org/10.1140/epja/i2011-11130-4

O. S. Kirsebom, S. Hyldegaard, M. Alcorta, M. J. G. Borge, J. Büscher, T. Eronen, S. Fox, B. R. Fulton, H. O. U. Fynbo, H. Hultgren, A. Jokinen, B. Jonson, A. Kankainen, P. Karvonen, T. Kessler, A. Laird, M. Madurga, I. Moore, G. Nyman, H. Penttilä, S. Rahaman, M. Reponen, K. Riisager, T. Roger, J. Ronkainen, A. Saastamoinen, O. Tengblad, and J. Ästö. *Precise and accurate determination of ^{8}B decay spectrum.* Physical Review C **83**, 065802 (2011), URL http://dx.doi.org/10.1103/physrevc.83.065802

E. Tengborn, A. M. Moro, T. Nilsson, M. Alcorta, M. J. G. Borge, J. Cederkäll, C. Diget, L. M. Fraile, H. O. U. Fynbo, J. Gomez-Camacho, H. B. Jeppesen, H. T. Johansson, B. Jonson, O. S. Kirsebom, H. H. Knudsen, M. Madurga, G. Nyman, A. Richter, K. Riisager, G. Schrieder, O. Tengblad, N. Timofeyuk, M. Turrion, D. Voulot, and F. Wenander. *The $^{8}Li + ^{2}H$ reaction studied in inverse kinematics at 3.15*

MeV/nucleon using the REX-ISOLDE post-accelerator. Physical Review C **84**, 064616 (2011), URL http://dx.doi.org/10.1103/physrevc.84.064616

O. S. Kirsebom, M. Alcorta, M. J. G. Borge, M. Cubero, C. A. Diget, R. Dominguez-Reyes, L. M. Fraile, B. R. Fulton, H. O. U. Fynbo, S. Hyldegaard, B. Jonson, M. Madurga, A. M. Martin, T. Nilsson, G. Nyman, A. Perea, K. Riisager, and O. Tengblad. *Breakup of ^{12}C resonances into three α particles.* Physical Review C **81**, 064313 (2010), URL http://dx.doi.org/10.1103/physrevc.81.064313

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